of heated oxidized collagen, prepared as in example 6, and heated non-oxidized collagen, in any proportions.

The collagen used for preparing non-oxidized, heated collagen is type I bovine collagen, extracted from calf dermis, possibly solubilized by pepsin digestion and purified by saline precipitation using the techniques already described. Type I or type III human collagens or mixtures of these in any proportions can be used in the same way.

A 30 g/l solution of non-oxidized, heated collagen is prepared by dissolving 65.2 g of damp collagen (12% humidity) in 1940 g of ultrafiltered water at 42° C. A sterile concentrated solution of PEG 4000 (polyethylene glycol with a molecular weight of 4000 Daltons), glycerine and possibly oxidized, heated collagen prepared as in example 6 is added to this solution at 42° C. to produce a final concentration of 0.9% PEG, 0.54% glycerine and 2.7% total collagen. The pH of the solution is adjusted to 7.0, by adding a concentrated solution of sodium hydroxide.

Example 8

Preparation of an Acid Solution of Non-oxidized Heated Collagen Designed to Form a Film:

An acid solution of heated, non-oxidized collagen, for the film, is prepared as in example 7, with the following differences:

i) the collagen used is only non-oxidized heated collagen, the preparation of which is described in example 1;

ii) the mixture used for the film, of which the final concentrations of PEG, glycerine and collagen are 0.9%, 0.54% and 2.7% respectively, is acid.

Example 9

Preparation of a Bicomposite Material From a Collagen Compress:

The collagen solution destined to form the film, as described in examples 4 to 7, is poured in a thin layer with a density of 0.133 g/cm^2 on a flat hydrophobic support such as PVC or polystyrene, at an ambient temperature close to 22° C.

A collagen compress, prepared as in examples 1, 2 or 3 is applied uniformly to the solution of heated collagen, 5 to 20 minutes after it was poured onto the support. This waiting time is the collagen solution gelling time, required for application of the collagen compress, to prevent it dissolving or becoming partially hydrated in the liquid collagen.

Penetration of the compress into the gelled collagen solution is judged to be less than 0.5 mm.

The material is then dehydrated in a jet of sterile air, at ambient temperature, which leads to evaporation in about 18 hours.

The bicomposite material obtained is easy to remove from the support.

It can be cut to the dimensions required for the application concerned, without weakening it.

The bicomposite material is then put into an airtight double polyethylene bag.

The unit is sterilized by gamma irradiation or electron beam (beta) irradiation at a dose of between 25 and 35 KGy.

The material is stable at ambient temperature.

The presence of glycerine in the material essentially helps to make the film more flexible and facilitates its use. The material can be prepared without glycerine.

The use of PEG 4000 as macromolecular hydrophilic agent is not limiting. PEG 3000, PEG 6000 or polysaccharides such as soluble starch (OSI, France) and Dextran T40 (Pharmacia Fine Chemicals, Sweden) can be used instead.

FIGS. 1 and 2 are photographs taken under scanning electron microscope, enlarged by 40 and 200 times respectively, illustrating the structures of the bicomposite material prepared as indicated above.

FIG. 1 shows a specimen of example 9 made from the compress as in example 1 prepared from pepsinated collagen, the film being produced as in example 6.

FIG. 2 shows a specimen of example 9 made from the compress as in example 3, the film being produced as in example 8.

Example 10

Preparation of a Bicomposite Material Using an Oxidized Cellulose Compress:

The procedure is the same as for example 9 but using a porous compress based on oxidized cellulose as is available on the market under the name Interceed® or Surgicel®.

What is claimed is:

1. A method for obtaining a bicomposite material which has two closely bound layers and is bicompatible, non-toxic and biodegradable in less than one month, said method comprising the steps of:

(i) pouring a solution of collagen or gelatin onto an inert support so as to form a 30 μm to less than 100 μm-thick layer;

(ii) applying to the solution during gelling of the collagen or gelatin a polymeric porous fibrous layer having a density of no more than 75 mg/cm^2, a pore size from 20 μm to 300 μm and a thickness of 0.2 cm to 1.5 cm; and

(iii) drying or leaving to dry the material obtained from step (ii) to provide said bicomposite material.

2. The method according to claim 1, wherein the solution of collagen in step (i) has a concentration of collagen of between 5 and 50 g/l.

3. The method according to claim 2, wherein the solution of collagen in step (i) is an acid solution of native collagen.

4. The method according to claim 1, wherein the solution of collagen in step (i) includes collagen modified by oxidative cleavage.

5. The method according to claim 4, wherein the solution of collagen in step (i) is modified by treatment with periodic acid or one of its salts.

6. The method according to claim 1, wherein the solution of collagen in step (i) is heated to a temperature of between 40° and 50° C.

7. The method according to claim 1, wherein at least one macromolecular hydrophilic additive; chemically unreactive with respect to the collagen or gelatin, is added to the solution of collagen in step (i).

8. The method according to claim 7, wherein the concentration of hydrophilic additive(s) is 2 to 10 times less than the concentration of collagen in the solution in step (i).

9. The method according to claim 7, wherein glycerine is added to the solution of collagen in step (i).

10. The method according to claim 9, wherein the concentration of glycerine is between 3 and 8 g/l and does not exceed one third of the concentration of collagen of the solution in step (i).

11. The method according to claim 1, wherein the collagen solution in step (i) is an aqueous solution containing 2 to 10% of collagen or gelatin, 0.6 to 4% of hydrophilic additive(s) and 0.3 to 2.5% of glycerine.

12. The method according to claim 1, wherein the solution in step (i) is neutralized.

13. The method according to claim 1, wherein the support in step (i) is a PVC or polystyrene support.

14. The method according to claim 1, wherein the solution in step (i) has a density of between 0.1 and 0.3 g/cm^2.

15. The method according to claim 1, wherein the collagen or gelatin solution in step (i) is poured at a temperature of 4 to 30° C.

16. The method according to claim 1, wherein the polymeric porous fibrous layer in step (ii) is made of collagen.

17. The method according to claim 16, wherein the polymeric porous fibrous layer of step (ii) is prepared from an aqueous acid solution of collagen, the concentration of which is 2 to 50 g/l when the collagen is not denatured.

18. The method according to claim 17, wherein the aqueous acid solution of collagen is neutralized to a pH of around 7 to 8.

19. The method according to claim 17, wherein the solution of collagen used to prepare the polymeric porous fibrous layer of step (ii) is freeze-dried.

20. The method according to claim 19, wherein the solution of collagen used to prepare the polymeric porous fibrous layer of step (ii) is spread in a layer with a density of between 0.2 and 1.5 mg/cm^2 for freeze-drying.

21. The method according to claim 1, wherein the polymeric porous fibrous layer of step (ii) is made of polysaccharide.

22. The method according to claim 1, wherein the polymeric porous fibrous layer of step (ii) is made of polysaccharide modified by oxidation of the alcohol functions into carboxylic function.

23. The method according to claim 1, wherein, when the polymeric porous fibrous layer is applied to the solution of collagen or gelatin during gelling, the polymeric porous fibrous layer of step (ii) is allowed to penetrate for around 0.05 to 2 mm in the gel which is forming.

24. The method according to claim 1, wherein the material obtained is dried in a jet of sterile air in step (iii).

25. The method according to claim 1, wherein the polymeric porous fibrous layer is produced by freeze-drying a collagenic emulsion and a gas.

26. The method according to claim 1, wherein the material obtained is sterilized in step (iii).

27. The method according to claim 7, wherein the macromolecular hydrophilic additive has a molecular weight of between 3,000 and 20,000 Daltons.

28. The method according to claim 7, wherein the macromolecular hydrophilic additive is polyethylene glycol.

29. The method according to claim 7, wherein the hydrophilic additive is chosen from the group consisting of polysaccharides and mucopolysaccharides.

30. The method according to claim 7, wherein the hydrophilic additive is an oxidized polysaccharide.

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